PERTUSSIS

The Old and New

What is whooping cough (pertussis)

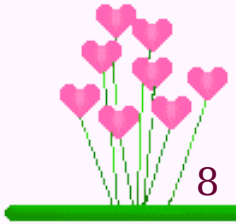
- Whooping cough, or pertussis, mainly affects infants and young children.
- Caused by a bacterium, it is characterized by paroxysms (intense fits or spells) of coughing that end with the characteristic “whoop” as air is inhaled.

What causes whooping cough?

- Whooping cough is caused by a bacteria called Bordetella pertussis.
- It is spread through children from exposure to infected persons through droplets in the air.

History

- The first definite account of the disease was recorded by the French physician in 1578,
- The first clear and thorough description of it came from Thomas Willis an English physician, in 1675.
- Another English physician, Thomas Sydenham, introduced the term *whooping cough* that same year.



- 1906 - While carrying out research on antibody and antigen reactions in blood, Bordet and Gengou discovered the bacillus that causes whooping cough. The two scientists were then able to prepare a vaccine for the disease.
- Unfortunately, the Bordet-Gengou vaccine was not very effective and whooping cough continued to be a dreaded disease

- In 1932 Dr. Pearl Kendrick and Dr. Grace Eldering
  - Gathered specimens from children in poor, Depression-era homes
  - Developed precise, standard methods of preparing vaccine
  - Established sterility, safety, and effectiveness tests
  - Conducted well-controlled field trials.

PROBLEM?

- Pertussis is still one of the leading causes of vaccine-preventable deaths.
- There are 30–50 million cases per year, and about 300,000 deaths per year.
- Virtually all deaths occur in children under one year of age.
- Ninety percent of all cases occur in developing countries.

- In the United States, 5000-7000 cases are reported each year.
- Incidence of pertussis has increased steadily since the 1980s.
- The incidence in 2002 was 8,296 cases of pertussis reported.
- The disease is endemic in the United States with epidemic cycles every 3--4 years.

What are the symptoms?

- The disease usually takes one to three weeks to incubate, with the child usually passing through three stages.
- The following are the most common symptoms of whooping cough, according to each stage.

- Catarrhal stage (often lasts one to two weeks):
  - mild cough
  - low grade fever
  - runny nose

- Acute phase (may last for several weeks):
  - Cough gets worse and comes in severe fits
  - Cough is dry and harsh
  - Cough ends with a whoop sound on inspiration
  - Child may vomit with the coughing and appear to be strangling on the vomit
  - Cough can be started by many factors, including feeding, crying, or playing

- Recovery phase (usually begins around the fourth week):
  - Vomiting and the whooping cough cease first
  - The cough usually decreases around the sixth week, but may continue on occasion for the next one to 2 months
  - Whooping cough can last up to several weeks and can lead to pneumonia.

Diagnosis

- Culture taken from the nose (See handout)
- Despite increasing awareness and recognition of pertussis as a disease that affects adolescents and adults, pertussis is overlooked in the differential diagnosis of cough illness in this population

Treatment

- Pertussis is one of a few bacterial infections for which antibiotic treatment has little effect on the course of the illness.
- Treatment lessens the severity of pertussis if given early in disease, before the cough is well established and usually before the illness is recognized as pertussis
- Vaccination is the most effective strategy

- A macrolide (erythromycin, azithromycin (Zithromax®) administered early in the course of illness can reduce the duration and severity of symptoms and lessen the period of communicability
- Approximately 80%--90% of patients with untreated pertussis will spontaneously clear *B. pertussis* from the nasopharynx within 3--4 weeks from onset of cough
- Untreated and unvaccinated infants can remain culture-positive for >6 weeks (

Complications

- Major complications are most common among infants and young children and include:
  - Hypoxia
  - Apnea
  - Pneumonia
  - Seizures
  - Encephalopathy
  - Malnutrition.
- Most deaths occur among unvaccinated children or children too young to be vaccinated.

Risk Groups

- Children who are too young to be fully vaccinated and those who have not completed the primary vaccination series are at highest risk for severe illness.
- Like measles, pertussis is highly contagious with up to 90% of susceptible household contacts developing clinical disease following exposure to an index case.
- Adolescents and adults become susceptible when immunity wanes.

Postexposure Prophylaxis

- A macrolide can be administered as prophylaxis for close contacts of a person with pertussis if the person has no contraindication to its use.
- The decision to administer postexposure chemoprophylaxis is made after considering the infectiousness of the patient and the intensity of the exposure, the potential consequences of severe pertussis in the contact, and possibilities for secondary exposure of persons at high risk from the contact (e.g., infants aged <12 months).

- For postexposure prophylaxis, the benefits of administering an antimicrobial agent to reduce the risk for pertussis and its complications should be weighed against the potential adverse effects of the drug.
- Administration of postexposure prophylaxis to asymptomatic household contacts within 21 days of onset of cough in the index patient can prevent symptomatic infection.

Prevention

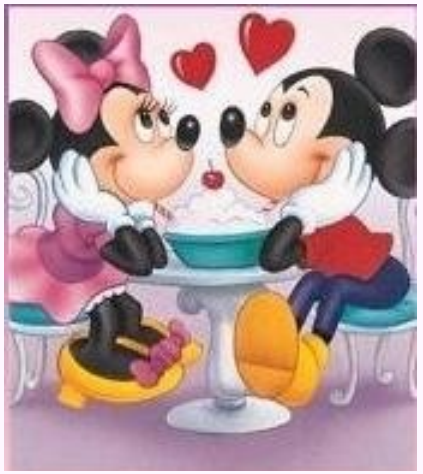
- This disease can be prevented with proper immunizations using the pertussis vaccine. This is usually part of the DTaP vaccine - or the diphtheria, tetanus, and pertussis.
- This vaccine is usually given to children at 2, 4, 6, and 15 to 18 months of age, with a booster at 4 to 6 years of age.

Adolescents

- Adolescents with pertussis are increasingly reported across the United States
- The provisional counts were ~8000 reported cases in adolescents in 2004

- The impact of pertussis among adolescents is significant
- The substantial morbidity includes prolonged cough that can last for more than 3 months in about half of adolescents with pertussis.
- ¾ of adolescents have trouble sleeping, about half vomit with severe paroxysms of cough
- A small percentage of adolescents lose consciousness during these paroxysms.

- About a 1/3 lose weight during the illness.
- Complications include pneumonia in 2%, rib fractures from violent coughing in 1%, and ~1% of adolescents with pertussis are hospitalized.



Vaccine

- BOOSTRIX® Tdap is manufactured by GlaxoSmithKline
  - It was licensed May 3, 2005 for use as a single dose in
  - Adolescents aged 10-18 years
- ADACEL™ Tdap
  - Licensed June 10, 2005 for use as a single does in
  - Ad nts and adults aged 11-64 years

♥ HAPPY ♥
VALENTINES DAY

TOTAL HEARTS